Document Title: Reporting on the Rovers
Author: Melissa Rice

Course: Astronomy 1110
Course Title: The Exploration of Mars

Year of Award: Spring 2011

Winner

Spring 2011 James Slevin Assignment Sequence Prize

We are pleased to invite applications for the James Slevin Assignment Sequence Prize. This prize of $500 will be awarded to the teacher submitting the best sequence of writing assignments for a First-Year Writing Seminar (honorable mentions, if any, will receive $150).

Assignment sequences in a writing course are built around a series of essay topics. These sequences probably represent work assigned during a portion of the course rather than all of the essay assignments distributed over an entire semester. Submissions should include a rationale and a description of your plans for eliciting and responding to student drafts and revisions, as well as a description of how you prepare students for each essay assignment, for example by engaging them in preparatory writing exercises, including informal writing designed to help students understand the material on which they subsequently write formal essays. Reflections on what worked well, and why, and what you would change another time, are welcome.

The winner will be announced to the Cornell community. Prize Winning Materials will be deposited in a web accessible archive and made available to other instructors under a creative commons attribution, non-commercial license. (See creativecommons.org for more information about cc licensing.)

Submissions are due in 101 McGraw Hall by Friday, May 20. No exceptions can be made.

Spring 2011 James F. Slevin Assignment Sequence Prize Application

~Please Print Clearly. Do **not** staple. Use paper clips only.~

Instructor's name Melissa Rice

Department ASTRO Course # and title 364162-15011, ASTRO 1110: The Exploration of Mars

Should I win a prize, I give the John S. Knight Institute permission to publish, quote from, and/or distribute copies of the assignment sequence, and to distribute publicity to newspapers and other publications, local and/or national, about my winning the prize. I also grant the Knight Institute permission to deposit the assignment sequence in a web accessible archive and make it available under a creative commons attribution, non-commercial license. I am prepared to send electronic versions of my text to Donna O'Hora (dlo1@cornell.edu) in the Knight Institute. I understand that I will receive the award for my prize-winning essay upon submission of the electronic text.

Reporting on the Rovers

Title of Assignment Sequence

Instructor's signature _____ Date 5/20/2011

Astronomy 1110: The Exploration of Mars
Spring 2011
Melissa Rice

"Reporting on the Rovers"

A major appeal of my seminar was its timeliness; most of my students enrolled in a class titled "The Exploration of Mars" because Cornell is currently operating the Mars Exploration Rover mission. Thus, when planning my syllabus I knew that it would be very important – and fun – to incorporate as much of the live mission as possible into class assignments.

In the first part of the semester, I designed assignments and in-class activities to introduce students to the geography, geology, and exploration history of the planet Mars. I began each class session with a 5-minute "what's happening on Mars?" update, summarizing the rover planning meetings that had happened earlier in the day, and showing the latest photographs that had been downlinked from Mars. For the "Reporting on the Rovers" unit, I created a series of assignments to give students a chance to dive deeper into the active mission – and the planet – that they had been learning about.

Rationale:

My students were mostly engineering or science majors, and in their careers they will all – at some point – need to communicate complex, scientific ideas to audiences of non-specialists. Most scientists and engineers, even at the graduate school level, are not given formal opportunities to practice this skill. With this assignment series, my intention was to have students write about a technical subject for general audiences, and to simulate the process of science journalism.

Throughout the semester, I tried to emphasize differences in writing styles and their intended audiences. For example, during a class period in the second week, I had students read a short scientific journal article, a press release about the same work, and an online news story that followed the press release. We discussed the structures of these three pieces, and the different languages used for distinct audiences (of scientists, reporters, and the general public).

In the first part of the "Reporting on the Rovers" assignment series, I asked the students write a newspaper story about a recent discovery from the Mars rovers. This story would be intended for the general readership of a local newspaper. The assignment provided an inside look into how the Mars rover mission is operated, as well as how news stories get written (for example, as a preparatory exercise, they wrote a query letter to an editor). By participating in a mock press conference and doing outside research, students had a wealth of information to draw from; however, I enforced a strict length restriction on their stories of 700-800 words. My intention was to encourage students to *make each word count*, and to practice prioritizing information. Several students told me that the greatest challenge of the assignment was having to selectively chose information; in most of their college research essays to date, they said they had the opposite problem of "stretching" a limited amount of information to fill a long essay.

For the second part of the assignment series, the students wrote a narrative magazine article imagining that they are an astronaut retracing a rover's traverse on Mars

in the year 2046. This article was intended for the readership of *Scientific American*, and the assignment allowed us to explore the differences between newspaper and magazine articles (structure, style, length, audience, etc.). Because students were writing from the perspective of a future Mars explorer, they were able to add a creative component into their article and practice communicating scientific information through narrative writing. I encouraged students to have fun with the fictional portion of their story, and to add a compelling emotional narrative that would hold a reader's interest. In part, I designed this assignment with the goal of producing essays I would particularly enjoy reading.

These assignments underscored an important point that I wanted to emphasize in the course, which was that space exploration is funded by – and intended for – the general public. While it is scientists and engineers who design and operate spacecraft on other planets, the information learned and "sense of awe" that comes from these missions belongs to the larger population. It is the responsibility of NASA, the scientists and engineers involved, and the press to convey this information to the public in an accessible and engaging manner.

Components:

We began the series with a guest lecture by Lisa Grossman '07, a Cornell Astronomy major who now works as a science writer for Wired.com. Lisa spoke to the class about her experience transitioning from science to science writing, and pursuing a career in online journalism. She presented an overview of newspaper writing in the sciences, explaining fundamentals such as the "inverted triangle" the definition of "lede" and "nut graf." To introduce students to the process of science journalism, she passed out copies of each step in an article she had recently published, including the query letter, a draft with editor comments, and the final article.

The following class period was a "mock press conference," where four Mars Exploration Rover team members from the Department of Astronomy had volunteered to come speak about recent science discoveries from the rovers. Students came to class prepared with questions to ask the panel, and the event was recorded so that students could use the audio file to find accurate quotes for their articles. As a preparatory writing exercise, students wrote a formal query letter to their editor (me) describing their story idea and pitching their article. I wrote a formal response to each student that included suggestions about how to structure their article and develop their initial idea. This was the only feedback students received from me for the newspaper assignment; students gave feedback on a partner's rough draft in class using guided peer-review worksheets that I had prepared. I evaluated their final articles using the rubric I included with the assignment, and provided written comments as well. When their final assignment was due, I had students write a 10-minute reflection about the process of writing their articles. I used these reflections to gauge students' reactions to the assignment, and to gain insights into my students' writing habits.

To introduce the next assignment in the series, the magazine article, we read several articles about the Mars rover mission from *Scientific American*. We had a virtual guest lecture by Prof. Jim Bell over Skype, who is the Principal Investigator of the Mars rover cameras. Prof. Bell described the target audience of *Scientific American*, as well as the process of pitching and writing an article for that specific the magazine. The students' rough drafts were due the following class, and they went through a process of

guided peer review and received comments from me. As with the previous assignment, I evaluated their final articles using the rubric I included with the assignment, and students wrote an in-class reflection about their writing process on the day their final story was due.

Reflections:

Overall, this assignment series worked very well for my class. Students commented on enjoying the "real world" experience of participating in a press conference, selecting pertinent quotations, writing a query letter, and writing within a strict word limit. They found it both refreshing and challenging to experiment with different writing styles for general audiences.

Were I to assign this series again, I would revise the peer review component. Because all students had been studying Mars for several weeks at this point and were somewhat submersed in the language of Mars science, they had trouble catching the jargon in each others' rough drafts. One student said she read her draft to her Mom over the phone, who said, "what's a sol?" This was the only way the student caught that she failed to define "sol," the term for a Martian day – her peer reviewer had breezed right over it. Next time, I will make it a requirement for students to have someone *outside* the class – a friend, parent, walk-in writing tutor, etc. – complete and sign an additional peer review sheet.

Something that surprised me was the amount of creative writing required for the magazine article. I had designed the assignment as an interesting way for students to learn about a rover's traverse and practice writing for a broadly science-minded audience, but I had not anticipated the importance of storytelling and descriptive, vivid language to the success of their articles. In my comments on their drafts, I gave the same advice to almost every student: ***show***, don't *tell*! Most students made many broad statements, such as "the view was beautiful" or "I felt excited," instead of describing *what* made the view beautiful or *why* they felt excited. While I was impressed with the improvements in their final drafts, if I were to assign this series again I would design a preparatory writing exercise for students to practice using descriptive language to enhance the reader's experience.

ASTRO 1110: The Exploration of Mars

Unit 3 Assignment Series: "Reporting on the Rovers"

For this assignment series (Essays 4 and 5), you will be a science journalist, and I will be your editor. You'll start out as a struggling freelancer in Ithaca, NY in 2011 covering the still-active Mars Exploration Rover (MER) mission. You'll end up as a veteran staff writer for *Scientific American* on assignment at Mars in 2046.

Essay 4: Newspaper story

Many of the exciting discoveries made by the Spirit and Opportunity rovers have not received much press coverage – and that's where you come in. As a science writer freelancing from Ithaca, you have access to several scientists working on MER who can inform you about the latest discoveries. Your task is attend a press conference about Opportunity's latest discoveries, pick a particularly interesting topic from the press conference to write about, pitch your story idea to a newspaper editor, and write the polished newspaper article.

Part 1: The press conference
in-class on Monday, February 28

In class we will hold a mock press conference with a panel of MER team members:

Dr. Wes Watters, *postdoctoral researcher*
Dr. Rob Sullivan, *research associate*
Ryan Anderson, *graduate student*
Shoshanna Cole, *graduate student*

They will give a short presentation about recent science discoveries made by the Opportunity rover and then take questions from the press (you). Come to class prepared with three questions about recent events in the MER mission. I will record the press conference and post the audio file to Blackboard after class (this will be important for using accurate quotes in your article).

Part 2: The query letter
due Wednesday, March 2

As a freelance science journalist, your livelihood depends on convincing editors to publish your work (and to pay you for it!). The query letter is your key to catching an editor's eye. The letter should describe your story idea and explain why you are qualified to write the article. It should be short (1 page), single-spaced, and written in the format of a formal business letter.

Write a query letter to me, the editor of the *Ithaca Post-Intelligencer*, that convinces me to accept your article. Make your first paragraph especially catchy – editors glance through dozens of query letters each day and reject most of them, so yours has to stand out. Tell me what you want to write about and why the readers of the *Ithaca PI* would be interested (assume a readership of mostly college-educated Ithacans). Also, mention that you have attended a press conference and state who you plan to quote in your article.

You can expect to receive a response from the editor by the end of the week.

Part 3: The story
draft due Monday, March 7

Your story idea has been accepted by the *Ithaca PI*, and your editor wants to print it in the evening edition of the March 9 paper. Write a 700-800 word article (about 2 pages), and make sure to include the following:

- a headline that will grab the reader's attention
- three quotations from the press conference
- a relevant photograph and caption (with proper image credit and scale)
- any specific suggestions from your editor's response to your query

Bring a hard copy of your draft to class for peer-review on Monday.

Part 4: Peer-review
in-class on Monday, March 7

Complete the attached worksheet for your partner's draft.

Part 5. Polished article
due Wednesday, March 9

Use the advice given in your peer-review and the comments from your editor to revise your article so that it is crisp, clear, and ready for print.

Part 6. Reflection
in-class on Wednesday, March 9

Write a short reflection about the process of writing your article, including a description of what you found most challenging and a summary of the revisions you made to your first draft. Turn in your peer-review worksheet with your reflection.

ASTRO 1110: The Exploration of Mars Monday, March 7, 2011

Peer review worksheet for Essay 4

REVIEWER'S NAME:_____

REVIEWING THE DRAFT OF:_____

Take 20 minutes to read your partner's draft and write short responses (1-3 sentences) to the following questions. Give this page to your partner when you've finished, and explain your responses. Please hang on to your partner's comments and bring them to class on Wednesday to turn in.

1. Did the article grab your attention from the start? If not, how would you suggest revising the lede?

2. Is there enough information for you to understand the science story, and is the language appropriate (i.e., is there any jargon that should be changed)?

3. Did the overall organization and structure of the article follow the examples of newspaper writing we've seen in class? If not, how could it be rearranged?

4. Are the quotations properly introduced in the text? And how does the information they provide contribute to the article?

5. Is the image relevant to the story, and does the caption allow you to understand the image without reading the article?

6. What do you think works particularly well in this article, and what doesn't?

Essay 4 Assessment Rubric:

The criteria below describe how your Essay 4 will be evaluated. You will satisfy the grading contract if your essay receives all 2's and higher.

Content	**1**	**2**	**3**	**4**
Do you convince the reader that the topic of your article interesting and newsworthy?				
Do you provide enough information and explanation for your readers to understand the science?				
Do you include three quotations that contribute useful information to your article?				
Overall, is your essay convincing?				
Writing	**1**	**2**	**3**	**4**
Is your headline catchy?				
Does your article have an attention-grabbing lede?				
Is the organization and structure of the article follow appropriate for newspaper writing?				
Are the quotations properly introduced in your text?				
Is your article easy to read (*i.e.*, is it clear that you were thinking about the *reader* while you were writing)?				
Do you write for the appropriate audience of general readers (*i.e.*, do you avoid using jargon)?				
Is your article free of typos, grammatical errors, and other errors that could detract from the reader's experience?				
Image	**1**	**2**	**3**	**4**
Does the image enhance the reader's understanding of your article?				
Is the image caption sufficient to stand on its own (*i.e.*, can you understand what the image is by reading the caption alone)?				
Do you provide the proper image credit and a scale?				
Revision	**1**	**2**	**3**	**4**
Have you substantively revised your first draft based on peer feedback?				

1: Below expectations; 2: Meets expectations; 3: Exceeds expectations; 4: Highly exceptional

Essay 5: Magazine article

Your front-page story about MER in the *Ithaca PI* on March 9 got national attention and launched your illustrious career as a science journalist. Now the year is 2046 and you are a staff writer for *Scientific American*, where I am your editor once again. NASA has been maintaining a Mars-base for the past 5 years, and astronaut-geologists are beginning to explore a wide range of environments across the planet. This week, two crews will be visiting the historic landing sites of the Spirit and Opportunity rovers and walking along their traverse paths. Your assignment is go to Mars, join one of these two crews, and write a magazine article about the experience for the readers of *Scientific American*.

The article should be 5-7 pages double-spaced, and written as a first-person narrative (refer to the examples from class and to Jamie Shreeve's chapter in *A Field Guide for Science Writers* for some guidelines on narrative writing). It should include a description of at least three of the stops you make while following the traverse and why they were important to MER – these can be at specific science targets, overlooks, spacecraft fragments (*e.g.* Opportunity's heat shield), or places where something important happened to the rover (*e.g.*, where Spirit's wheel motor failed). Finally, the article should include a detailed description of finding the rover itself.

You are encouraged to be creative in describing the human experience of retracing a MER traverse – but be as accurate as possible with the Mars science. Assume your readers are familiar with the details of human exploration on Mars in 2046 (*i.e.*, don't bother describing your spacesuit, transportation, or any other practicalities of life on Mars unless it directly pertains to your MER traverse experience).

Part 1. Partial draft
due Wednesday, March 16

Write the first two pages of your article and bring a hard copy to class on Wednesday for peer-review.

Part 2. Peer-review
in-class on Wednesday, March 16

Save your peer review worksheets and bring them to class on Monday, April 4.

Part 3. Full draft
due Monday, March 28 (after Spring Break)

Use the advice given in your peer-review to revise your first two pages and finish a draft of your full article. Your editor will comment on your draft by the end of the week.

Part 4. Polished article
due Monday, April 4

Use your editor's advice to polish your article and submit a final draft that is ready for print.

Part 5. Reflection
in-class on Monday, April 4

Write a short reflection about the process of writing your article, including a description of what you found most challenging and a summary of the revisions you made to your first draft. Turn in your peer-review worksheet with your reflection.

Essay 5 Assessment Rubric:
The criteria below describe how your Essay 5 will be evaluated. You will satisfy the grading contract if your essay receives all 2's and higher.

Content	**1**	**2**	**3**	**4**
Does your narrative tell a story with a beginning, middle and end?				
Does your story serve to educate your readers about Mars, as well as to entertain them?				
Are your descriptions of Mars scientifically accurate?				
Are your descriptions of the rover and its traverse factually accurate?				
Do you describe at least three specific stops along the rover's traverse, as well as the rover itself?				
Is there an emotional content to your narrative (*i.e.*, is there a compelling human story)?				
Writing	**1**	**2**	**3**	**4**
Is your title catchy?				
Is your first paragraph particularly grabbing? Does it make the reader want to continue reading your story?				
Do your descriptions create a sense of place so that the reader can vividly imagine your experience on Mars?				
Is your language captivating, and does it hold the reader's interest?				
Is your article easy to read (*i.e.*, is it clear that you were thinking about the *reader* while you were writing)?				
Do you write for the appropriate audience of *Scientific American* readers (*i.e.*, do you avoid using jargon but assume some general science knowledge)?				
Is your article free of typos, grammatical errors, and other errors that could detract from the reader's experience?				
Revision	**1**	**2**	**3**	**4**
Have you substantively revised your first draft based on peer and instructor feedback?				

1: Below expectations; 2: Meets expectations; 3: Exceeds expectations; 4: Highly exceptional

ASTRO 1110: The Exploration of Mars Wednesday, March 16, 2011

Peer review worksheet for Essay 5

REVIEWER'S NAME:_____

REVIEWING THE DRAFT OF:_____

Take 20 minutes to read your partner's draft twice and write short responses (1-3 sentences) to the following questions. Give this page to your partner when you've finished, and explain your responses. Please hang on to your partner's comments and **bring them to class on Monday, March 28** to turn in.

1. How does the author create a sense of place in these first two pages? Does it feel like the writing has *brought you to Mars*? If not, what improvements can you suggest?

2. What has the author done to catch your interest in the first paragraph – and what has he/she done to maintain it over the next two pages?

3. Where do you think this story is leading? Take a guess as to what will happen on the next page.

4. Did you find any sentences or ideas that were unclear (either because of sentence structure or because they expressed concepts that were difficult to follow)? If possible, suggest a way to clarify these sentences or ideas.